

# The Western Pacific Regional Report

## THE COMMERCIAL HARVESTING SECTOR

### Introduction

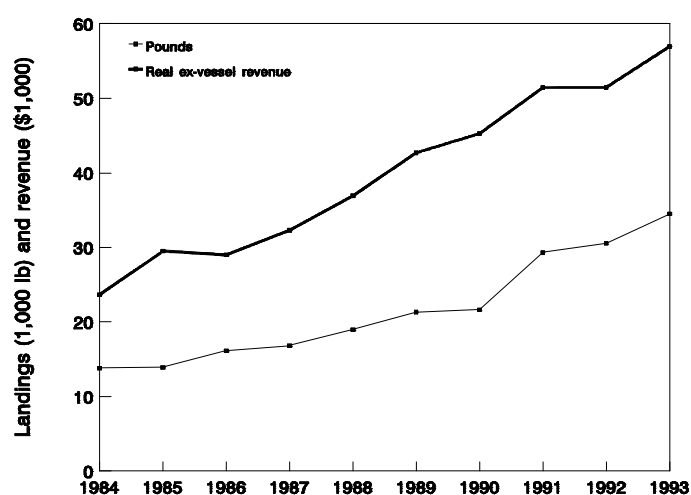
U.S. domestic fisheries in the western Pacific Ocean are conducted in three geographical areas: Hawaii's EEZ and the surrounding North Pacific, the EEZ's of American Samoa, Guam, and the Northern Mariana Islands, and the South Pacific distant-water tuna purse seine and albacore troll fisheries. This article concentrates on Hawaii fisheries with some reference to the other U.S. island fisheries. The purse seine and albacore fisheries are not covered in this report, but are the subject of the national spotlight issue.

### Hawaii Fisheries

Hawaii's commercial fisheries have experienced a dramatic period of rapid growth and structural change over the past 15 years

(Pooley, 1994). During this period the largest domestic fishery, the aku boat fishery (pole-and-line skipjack tuna fishery), collapsed due to the closure of the Honolulu tuna cannery. During the same time, the Northwestern Hawaiian Islands (NWHI) spiny and slipper lobster and bottomfish (snappers, groupers, and jacks) fisheries were developed, and the pelagic longline fishery (tunas, tuna-like fishes, billfish, and swordfish) exploded in activity. Total domestic commercial landings rose from 12 million pounds, worth \$20 million (in real dollars), in 1980 to 36 million pounds, worth \$59 million, in 1993 (Fig. 5-1). This represents a tripling of landings and real ex-vessel revenue in slightly more than a decade. Table 5-1 summarizes Hawaii's domestic commercial fishery in 1993.

Hawaii's domestic commercial fisheries are a mixture of mid-scale "distant-water" and small-scale fisheries which operate close to the main Hawaiian Islands (MHI). These latter fisheries are primarily handline and trolling but also include trap, spear, and various types of scoop-net fisheries. About 200 vessels crewed by about 1,250 people



**Figure 5-1**  
Hawaii commercial fishery landings and real ex-vessel revenues.

**Table 5-1**  
Hawaii domestic commercial landings, 1993<sup>1</sup>.

| Fleet                                     | Landings             |                               |
|---|----------------------|-------------------------------|
|   | Amount<br>(1,000 lb) | Nominal<br>value<br>(\$1,000) |
| Longline <sup>2</sup>                     | 26,500               | 57,000                        |
| Troll-hand pelagics <sup>3</sup>          | 4,800                | 7,800                         |
| Aku boat <sup>3</sup>                     | 2,100                | 2,400                         |
| MHI <sup>4</sup> bottomfish <sup>3</sup>  | 500                  | 1,500                         |
| NWHI <sup>5</sup> bottomfish <sup>2</sup> | 400                  | 1,200                         |
| NWHI Lobster <sup>2,6</sup>               |                      |                               |
| Other <sup>3</sup>                        | 1,400                | 2,500                         |
| Total                                     | 35,700               | 72,400                        |

<sup>1</sup>NMFS SWFSC Honolulu Laboratory estimates.

<sup>2</sup>National Marine Fisheries Service longline and lobster logbook estimates and NWHI shoreside monitoring of bottomfish landings.

<sup>3</sup>Hawaii Division of Aquatic Resources commercial catch reports for troll-handline, aku boat, MHI bottomfish, and other.

<sup>4</sup>MHI = Main Hawaiian Islands.

<sup>5</sup>NWHI = Northwestern Hawaiian Islands.

<sup>6</sup>Closed in 1993; 1992 landings of 466,000 pounds (\$2.1 million).

ple participate in the larger commercial fisheries, while an additional 2,500 people have commercial fishing licenses in the small-scale fishery<sup>1</sup>. Figures 5-2 and 5-3 display commercial fishing vessel participation for the three Federally regulated fisheries (longline and NWHI bottomfish and lobster), and the associated small-scale fisheries (troll-handline for pelagics and bottomfish). The figures show the dramatic increase in the longline fishery in the late 1980's as well as the mid-1980's peak in the development of the NWHI fisheries. Participation in small-scale fisheries has not been measured on an annual basis; the figures represent an average of full-time participation over the period (the same is true for crew employment and fishing effort). However, actual participation varies substantially, depending on overall economic conditions, the cost of fuel, fish availability (catch per unit effort), and fish prices.

#### Other Western Pacific Fisheries

The domestic commercial fisheries in American Samoa, Guam, and the Northern Mariana Islands are much smaller, but they are important locations for transshipment and processing for the U.S. distant-water purse seine fishery as well as for foreign purse seine and longline fisheries (Table 5-2).

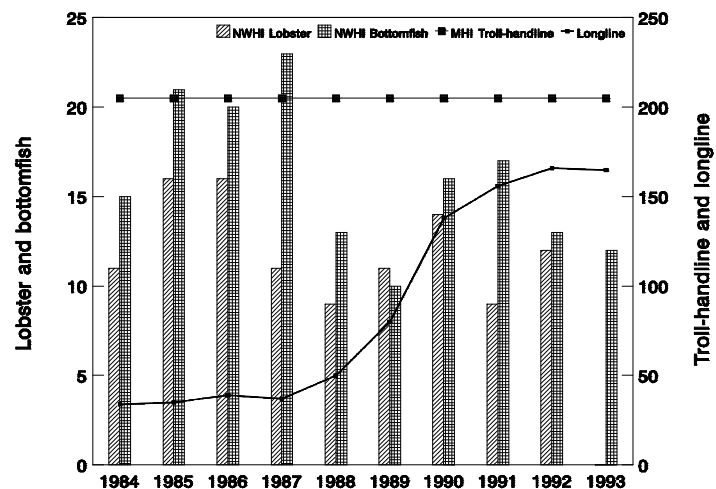
American Samoa has two tuna canneries that receive substantial quantities of U.S. distant-water purse seine landings and U.S. albacore troller landings, both destined for the canneries, and foreign

**Table 5-2**  
Domestic commercial fishery landings and revenue in American Samoa, Guam and the Northern Mariana Islands, 1993<sup>1</sup>.

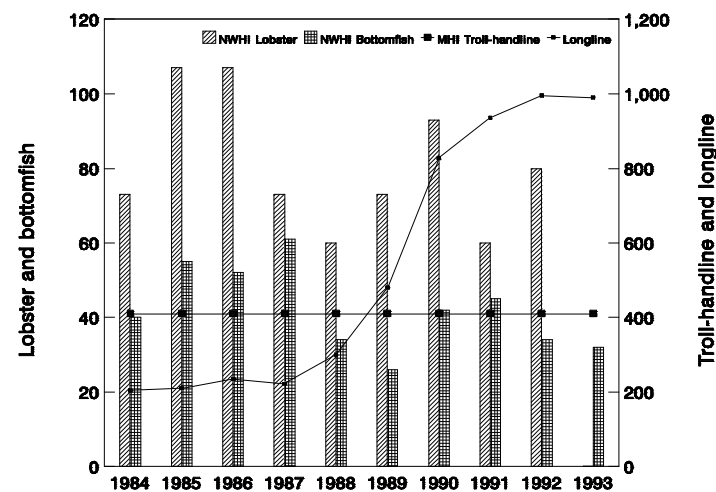
| Area                     | Landings<br>(1,000 lb) | Ex-vessel value<br>(\$1,000) |
|--------------------------|------------------------|------------------------------|
| American Samoa           | 108                    | 275                          |
| Guam                     | 373                    | 778                          |
| Northern Mariana Islands | 374                    | 613                          |

<sup>1</sup>NMFS WPACFIN (Western Pacific Fishery Information Network) data compiled from island fishery agencies.

<sup>1</sup>Most of these 2,500 commercial fishing license holders are part-time fishermen. We estimate full-time commercial participation in these fisheries at 200 vessels with about 400 crew members.



**Figure 5-2**  
Number of vessels participating in Hawaii commercial fisheries (NMFS estimates).



**Figure 5-3**  
Number of full-time crew members participating in Hawaii commercial fisheries (NMFS estimates).

tuna longline landings, some of which are reexported to Japan. Guam and the Northern Mariana Islands have both served as tuna transshipment centers for U.S. as well as Japanese and Taiwanese tuna fleets. Honolulu serves as a major center for resupply for Japanese, Taiwanese, and South Korean tuna longline vessels. While not commercial fishing per se (foreign vessels are not allowed to off-load in U.S. ports, excluding American

Samoa, Guam, and the Northern Mariana Islands), resupply is an important source of income in the marine sector for these three island economies as well as Hawaii.<sup>2</sup>

### Federally Regulated Fisheries

The domestic U.S. fisheries in this area are regulated by the Western Pacific Fishery Management Council (WPFMC) whose jurisdiction includes American Samoa, Guam, Hawaii, and the Northern Mariana Islands. The Federally managed domestic fisheries<sup>3</sup> (NWHI bottomfish and lobster fisheries and the Hawaii longline fishery) are controlled through limited entry arrangements (see this region's spotlight article) and various biological measures as well as technological measures to protect the endangered Hawaiian monk seal and a variety of sea turtles. Potential fishery management issues include: making a transition from nontransferable permits in the NWHI bottomfish limited entry fishery, finding an alternative to "boom-bust" quota seasonal management in the NWHI lobster fishery, controlling the growth of the pelagic longline limited entry fishery, and addressing the issue of bycatch in the longline fishery (particularly sea turtles but also sharks and the capture and sale of billfish). Although Hawaii's large-scale commercial fisheries operate out of a few ports (primarily those in Honolulu), the costs and diseconomies of regulation and enforcement necessitate a regulatory system that is relatively simple in design. Limited entry has been the preferred system in the past, but alternative management forms such as transferable effort rules and corporate or cooperative management are now being explored for these fisheries instead of enforcement-intensive ITQ's.

The NWHI fisheries are "distant-water" fisheries in the sense that vessels must travel at least 500 miles from Honolulu to reach the fishing grounds. Similarly, many of the productive longline fishing grounds are outside the U.S. 200-mile

EEZ around Hawaii. The vessels in these fisheries are relatively small (<100 feet in length). The NWHI bottomfish fishery is a deep-sea handline fishery, while the lobster fishery is a trap fishery. Participation in both the NWHI fisheries is low, with only 15 permitted vessels in the lobster fishery (with participation annually at 5-10 vessels) and only 35 permitted vessels in the bottomfish fishery. The NWHI lobster fishery was closed in 1993, experienced a truncated season in 1994, and was open under an experimental fishing permit for only one vessel in 1995. Vessels in the longline fishery average 70 feet in length overall. This fishery has larger participation, with 166 limited entry permits and as many as 125 vessels active in recent years.

### Fisheries in Hawaiian Waters

Fleets in the MHI are primarily comprised of small fishing vessels (<50 feet). The MHI pelagic fishery targeting tunas and billfish includes the few remaining aku boats, a large fleet of several thousand commercial and sportfishing charter trollers, and bottom handliners. The MHI bottomfish fishery uses bottom handlines as well as traps. Other fisheries include a trap fishery for lobster and shrimp and net fisheries for near-shore pelagics, as well as a number of dive fisheries for reef fish. While the landings from the MHI troll and handline vessels are characterized here as commercial, the distinction between commercial, recreational, and subsistence fishing is difficult in Hawaii, as discussed later.

### Economic Research in the NWHI Lobster Fishery

A thorough cost-earnings study indicated that the NWHI lobster fleet could be categorized into three size-ownership components on economic performance grounds. The larger vessels were estimated to be losing money largely due to high fixed costs; so were the medium-sized hired captain vessels due primarily to low productivity. However the owner-operator medium-sized vessels were estimated as profitable, due to both lower variable costs and higher productivity (Clarke and Pooley, 1988). Since 1986, when the economic data were collected, the largest vessels

<sup>2</sup>Iversen and Lucas (1992) estimated that the number of port calls by foreign longline fishing vessels into Honolulu Harbor averaged 2,500 visits annually in 1986-88, generating \$32 million annually in direct expenditures.

<sup>3</sup>There are also WPFMC fishery management plans for the Hawaii precious coral fishery and the Hawaii seamount groundfish fishery, but these fisheries have been closed for many years due to overharvesting by foreign vessels prior to the implementation of the MFCMA.

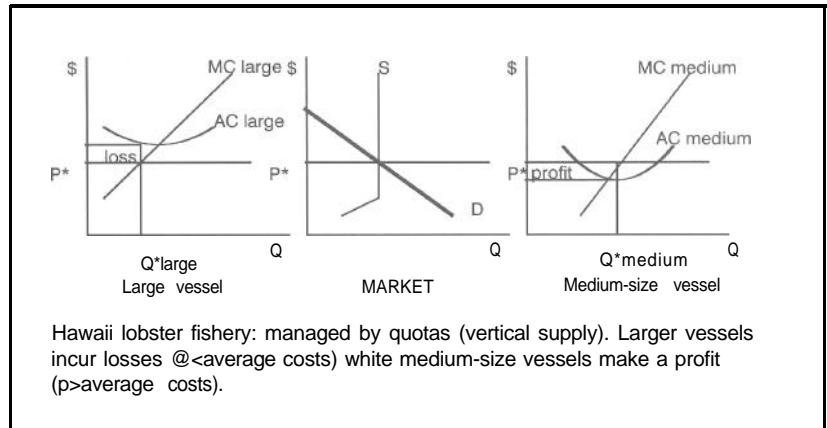
have reduced their participation in the fishery, as might be expected.<sup>4</sup> The medium-sized hired captain vessels have since undergone a number of changes, and those that remain in the fishery now operate more like owner-operator vessels.

A detailed bioeconomic model of the fishery was prepared using information from the late 1980's, prior to the current management regime (Clarke et al., 1992). This analysis indicated that the difference between maximum sustainable yield (MSY) and both maximum economic yield (MEY) and open-access equilibrium yield (OAY) was less than 12% in terms of landings (yield) but 42-45% in terms of fishing effort.<sup>5</sup> However, the bioeconomic model was based on a biological assessment that estimated MSY to be in the range of 1 million lobsters. A dramatic decrease in catch rates occurred in 1990, due to an oceanographic perturbation that affected recruitment to the lobster stocks, total lobster biomass, and the availability of spiny lobsters in particular (Polovina and Mitchum, 1992; Polovina et al., 1994). The reduced catch rates continued, resulting in the closure of the fishery in 1993, and a relatively small quota in 1994. Although MSY has not been "officially" revised, it appears that under the current environmental conditions the de facto MSY is 200,000-300,000 lobsters.

Thus, the situation in the NWHI lobster fishery was bleak. Furthermore, the management regime was economically inefficient with seasonal quotas and a "use-it-or-lose-it" rule on permits that promoted excess effort. For all but the smallest vessels (which might fish year-round at low levels of productivity if not for the seasonal quota) or those medium-sized vessels that could switch to the longline fishery when the lobster fishery was closed, the NWHI lobster fishery was no longer economically viable. While positive profits existed in the fishery's early years of development in the early 1980's, it appears that only the hope of improved conditions sustains participation in the fishery today. If the oceanographic conditions that suppressed biomass continue for many more years, the loss of an active market for Hawaiian lobsters will accentuate these problems.

<sup>4</sup>Except for participation forced by an every other year "use-it-or-lose-it" clause in the limited entry program.

<sup>5</sup>MEY indicates the most economically efficient level of production, and is usually at a lower level of fishing effort than MSY in a standard stock production model (see Chapter 2). OAY refers to the level of production in an open access fishery and is usually at a higher level of fishing effort than MSY.



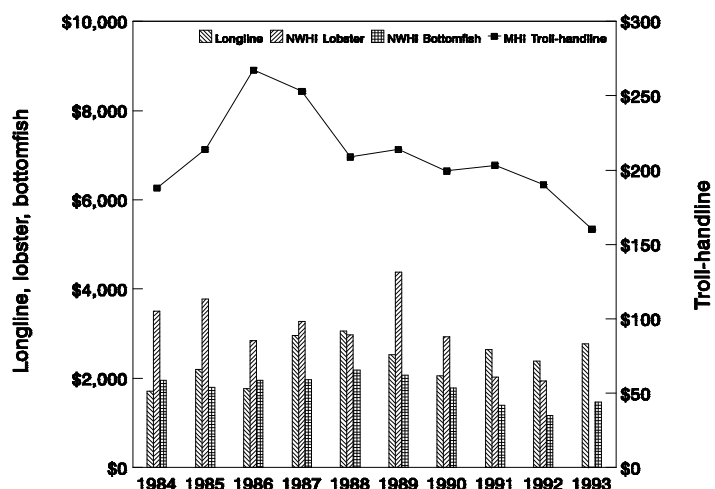
### Economic Research in the NWHI Bottomfish Fishery

The NWHI bottomfish fishery is divided into two regulatory zones: a more distant limited-entry zone and a closer open-access zone. Fifteen vessels have permits to operate in the limited-entry zone, while 20 are permitted to fish in the open-access zone. A recent study of this fishery suggested that the vessels in the limited-entry zone realized a small but positive economic return while those in the open-access zone realized substantial losses (Hamilton<sup>6</sup>). However, vessel operators in the open-access zone were found to have mixed motivations, with noncommercial fishing activities also important to them (e.g., recreational and charter fishing, funerals, and sight-seeing). The analysis indicated that the entire NWHI bottomfish fishery (i.e., eliminating the concept of "zones") could sustain 15 vessels on a full-time basis, as compared to 12 active vessels in 1993.

The regulatory impact analysis for the WPFMC's moratorium in the longline fishery estimated that the average longline fishing vessel realized an economic loss of \$85,000 in 19917. Not surprisingly, many longline vessel owners and captains also expressed distress in public meetings

<sup>6</sup>Hamilton, M. 1994. NWHI bottomfish fishery 1993 vessel activities: costs and economic returns. U.S. Dep. Commer., NOAA, Natl. Mar. Fish. Serv., Southwest Fish. Sci. Cent. Admin. Rep. H-94-1C.

<sup>7</sup>The RJR was constructed on sparse information. An important research initiative, the Pelagic Fisheries Research Project under the University of Hawaii and NOAA's Joint Institute for Marine and Atmospheric Research, has funded a comprehensive economic research project for Hawaii's pelagic fisheries. This will improve the status of economic information by the end of 1995. (Pooley, 1994c).



**Figure 5-4**  
Hawaii commercial fisheries real daily revenue per vessel, by fishery.

and at the docks about the condition of the fishery as well as the regulatory climate. This was a period of substantial regulatory uncertainty in the longline fishery, coinciding with the period in which a number of vessel operators were still learning how to use monofilament gear effectively. Economic conditions appear to have stabilized in the past 2 years and are expected to improve as longline permits become transferable under the new limited entry regulations.

The results from these and other economic studies of Hawaii's commercial fisheries (Fig. 5-4) show trends in estimated real average annual ex-vessel revenue per vessel. Revenue in the small-scale fisheries varies with catch rates; these vary annually due to the changing near-shore availability of highly migratory species such as tunas and other pelagics. Even in the longline and Northwestern Hawaiian Islands fisheries where larger vessel sizes predominate, there are substantial "booms and busts" in returns to the fisheries. These features are the result of Hawaii's geographical and oceanographic isolation, the topology of its ocean environment, and the effects of evolving economic and regulatory regimes.

### THE SEAFOOD PROCESSING SECTOR

Since the Hawaii market is dominated by fresh product, seafood processing is limited. Primary product forms include fish cake and

dried fish as well as various "specialty" packs. The NMFS Southwest Regional Office estimates that seafood processing in Hawaii was 9 million pounds in 1993, produced by 26 relatively small plants. Processed value was roughly \$16 million, less than 25% of landed ex-vessel value. Employment was estimated at 250 people, but many of these may also be engaged in retail operations.

### THE RETAIL MARKET AND TRADE SECTOR Hawaii's Seafood Markets

Domestic commercial landings provide about 27% of the Hawaii seafood market, with the balance supplemented by imports and shipments from mainland U.S. producers (Table 5-3). Hawaii's seafood market is primarily fresh product with bigeye and yellowfin tuna (known locally as ahi) directed toward sashimi (raw fish) at retail prices exceeding \$20 per pound at New Year's. Many of the other pelagics landed, of which mahimahi (dolphin fish) and striped marlin are mainstays, are directed at restaurants, along with many of the bottomfish. Skipjack tuna is commonly sold for home consumption, either as fillets or in a prepared product called poki (marinated with vinegar, soy sauce, and spices). Most of the swordfish is "exported" to the U.S. east coast. Frozen lobster tail was initially exported to the U.S. mainland or overseas, but under the current quota regime an increased percentage of the lobster harvest is sold as a live product and remains in Hawaii for the upscale restaurant market.

**Table 5-3**  
Supply and revenue of Hawaii seafood market channels, 1993<sup>1</sup>.

| Source of supply                              | Thousand pounds | Thousand dollars |
|---|-----------------|------------------|
| Domestic commercial landings                  | 35,700          | 72,400           |
| + Recreational landings                       | 10,200          |                  |
| = Hawaii domestic fishery landings            | 45,900          | 72,400           |
| + Foreign imports                             | 22,000          | 40,600           |
| + U.S. mainland "imports"                     | 34,300          | 62,400           |
| - Export (foreign and U.S. mainland)          | 14,600          | 29,600           |
| = Hawaii market (commercial only)             | 77,400          | 145,600          |
| = Hawaii consumption (including recreational) | 87,600          |                  |

<sup>1</sup>NMFS SWFSC Honolulu Laboratory estimates.

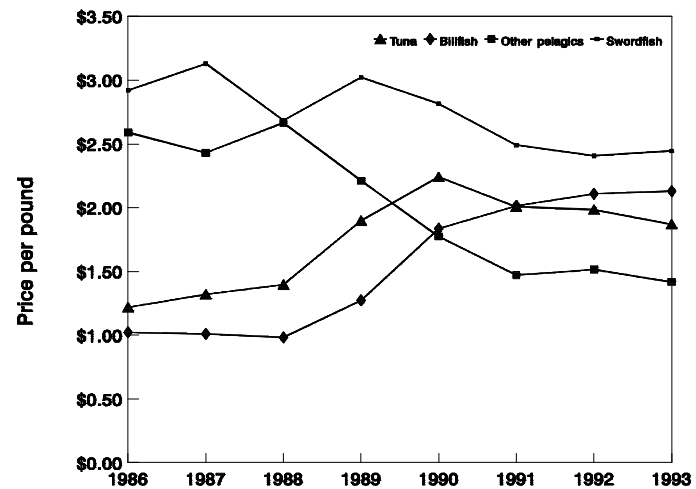
**Table 5-4**  
Hawaii seafood imports, 1993<sup>1</sup>.

| Item                   | Pounds imported |
|------------------------|-----------------|
| Fresh/frozen fish      | 9,231,130       |
| Fresh/frozen shellfish | 6,918,257       |
| Canned fish            | 181,555         |
| Canned shellfish       | 45,741          |
| Dried fish             | 38,270          |
| Dried shellfish        | 43,643          |
| Miscellaneous          | 264,433         |
| Total (Market News)    | 16,723,029      |
| Total (U.S. Customs)   | 22,000,000      |

<sup>1</sup>Data compiled from U.S. Food and Drug Administration samples by NMFS Southwest Region, Market News Division. NMFS Market News figures differ from U.S. Customs figures because invoices are not available for Market News recording on all imports. U.S. Customs figures do not provide species and product form details.

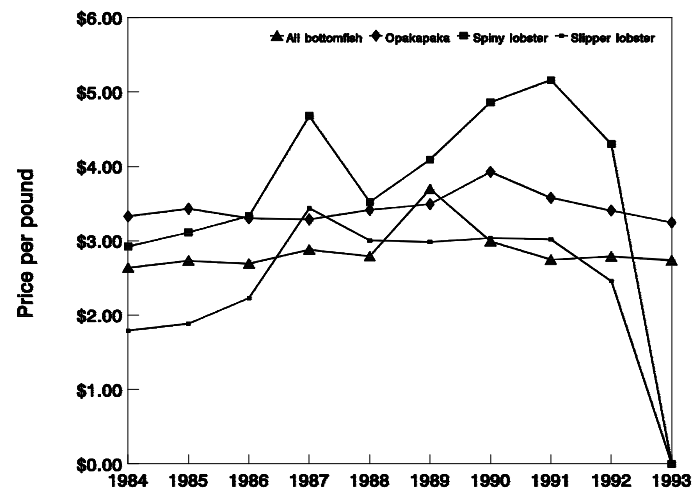
Figures 5-5 and 5-6 summarize ex-vessel, round-weight price trends for the major species. Swordfish prices show the shift from swordfish as a bycatch in the tuna longline fishery to a targeted species sold on the U.S. mainland. These prices also demonstrate the impact of Hawaii landings in that market. The dramatic increase in tuna prices may be inaccurate due to reporting problems, but it does represent the internationalization of the Hawaii tuna market, with ahi now sold throughout the U.S. mainland and Japan. Bottomfish prices, including the prized opakapaka (pink snapper), have shown little change over the period. The difference between spiny and slipper lobster prices indicates the difference in their market penetration.

While imports and exports are important to Hawaii's seafood markets, the volume is difficult to measure because of the unknown magnitude of interstate trade in both directions (e.g., South American mahimahi is imported through the Port of Los Angeles and then flown to Honolulu). Foreign imports directly into Hawaii in 1993 were 22 million pounds worth \$40 million, according to U.S. Customs; foreign exports were 850,000 pounds valued at \$4.5 million. Imports comprise the entire range of species and product form. Most of the exports were fresh tuna destined either for Japan or Europe. Figures 5-7 and 5-8 and Table 5-4 summarize Hawaii's seafood imports in 1993 using detailed species and product-form information. In Figure 5-8, the term "pelagics" refers to nontuna pelagics and is dominated by the import of fresh mahimahi loins and frozen mahimahi fillets.



**Figure 5-5**

Real average price per pound for Hawaii pelagic species.



**Figure 5-6**

Real average price per pound for Hawaii bottomfish and lobster.

## THE RECREATIONAL AND SUBSISTENCE HARVESTING SECTORS

The distinction between commercial, recreational, and subsistence fishing in Hawaii's small boat fishing fleets is primarily one of terminology. Even sportfishing charter boat captains who target blue marlin generally sell their catch.

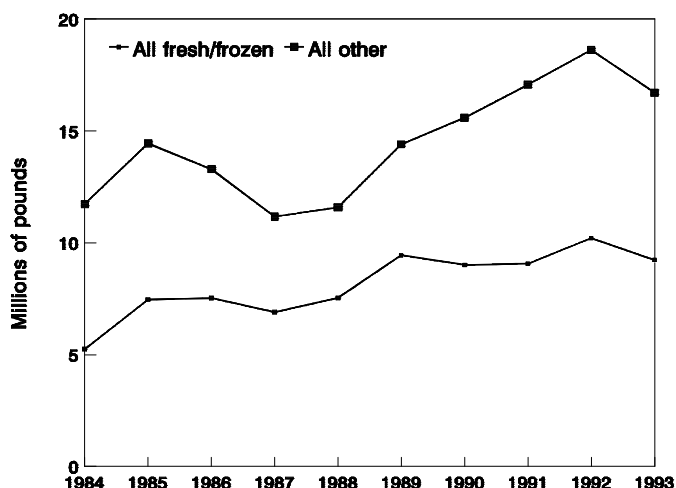


Figure 5-7  
Fresh/frozen seafood imports to Hawaii.

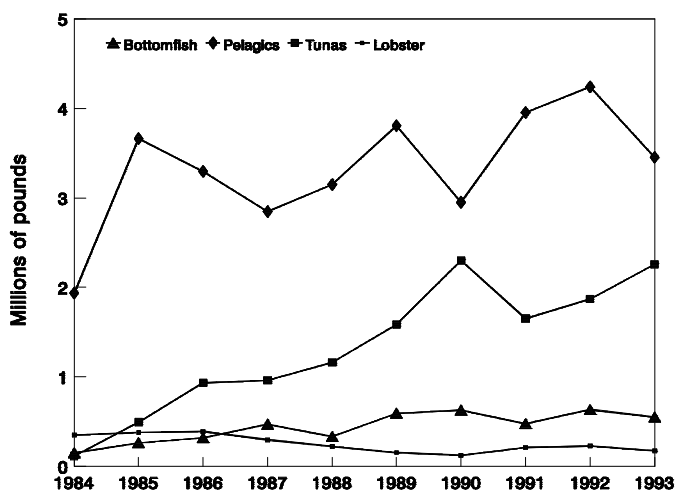


Figure 5-8  
Fresh/frozen seafood imports to Hawaii, by product category.

“Weekend warriors” often keep smaller fish for home consumption or sharing among extended family and friends but sell larger fish at the local auctions. Subsistence fishing tends to operate the same way.

There have been no systematic surveys of the recreational and subsistence fisheries in Hawaii since 1979-81, but it does not appear that participation in the off-shore fishery has increased sub-

stantially. Recreational landings<sup>8</sup> in 1980 were estimated to be about 10 million pounds<sup>9</sup>. Participation in these fisheries was estimated at 320,000 people (24% of Hawaii’s population) taking 708,000 boat trips. While the volume of noncommercial landings is now only a small part of total harvest, fishing plays an important cultural role in Hawaii for native Hawaiians and for more recent immigrants. Sportfishing as a tourist attraction and in tournament form is an important marine sector business.

There have been few economic studies of these sectors. Charter fishing vessels have had a hard time financially, and investment in that sector has been stagnant. However, efforts by the industry and the State of Hawaii have been made to improve marketing of charter boat fishing. Studies suggest that there are mixed motivations both for owning and operating charter fishing vessels (i.e., motivations are not entirely revenue-based) and for charter fishing patrons (i.e., motivations are not necessarily catching fish [Samples et al.<sup>10</sup>; Samples and Schug<sup>11</sup>]). Both Samples and SMS Research<sup>12</sup> and Meyer<sup>13</sup> found substantial non-market economic values for people participating in these fisheries.

Two important fishery management issues relate to the recreational and subsistence pelagic fisheries: first, gear and biological interaction problems between the commercial longline and non-commercial small-boat fleets were the subject of intense negotiations in 1990-91. This resulted in 25-50 mile longline area closures around the MHI<sup>14</sup>. Second, the commercial sale or tag-and-re-

<sup>8</sup>Landings by people who did not consider themselves commercial fishermen.

<sup>9</sup>Unpublished NMFS figures from the Marine Recreational Fishing Statistical Survey.

<sup>10</sup>Samples, K. C., J. N. Kusakabe, and J. T. Sproul. 1984. A description and economic appraisal of charter boat fishing in Hawaii. NMFS Southwest Fish. Cent. Admin. Rep. H-84-6C, 130 p.

<sup>11</sup>Samples, K. C., and D. M. Schug. 1985. Charter fishing patrons in Hawaii: a study of their demographics, motivations, expenditures, and fishing values. NMFS Southwest Fish. Cent. Admin. Rep. H-85-8C, 95 p.

<sup>12</sup>Samples, K. C., and SMS Research, Inc. 1983. Experimental valuation of recreational fishing in Hawaii. NMFS Southwest Fish. Cent. Admin. Rep. H-83-11C, 42 p.

<sup>13</sup>Meyer Resources Inc. 1987. A report on resident fishing in the Hawaiian Islands. NMFS Southwest Fish. Cent. Admin. Rep. H-87-8C, 74 p.

<sup>14</sup>The general problem of interaction between the Hawaii longline fleet and the small-boat pelagic fisheries in Hawaii, as well as the problems of annual variability in catch rates, is discussed in Boggs (1991) and Skillman et al. (1993).

lease of billfish (particularly marlins) by small-boat pelagic fisheries, particularly within the charter boat sports fishing community, became an issue. While several tournaments have experimented with tag-and-release, it remains controversial in Hawaii, particularly if the mortality of released billfish is high, since selling or consuming all fish is an expected part of local culture.

Finally, although not strictly a subsistence fishing matter, the issue of native Hawaiian (as well as native Chamorro in Guam) rights is of increasing interest. The WPFMC's NWHI bottomfish FMP reserves rights to be determined for native Hawaiian fishermen, and many of the near-shore fishing issues are particularly important to local communities. The WPFMC has played a leading role in attempting to identify and resolve some of these issues.

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